

# BORON STATISTICS

By David A. Buckingham and Phyllis A. Lyday

[All values are in metric tons (t) unless otherwise noted]

Last modification: August 28, 2002

Year	Production	Imports	Exports	Apparent consumption	Unit value (\$/t)	Unit value (98\$/t)	World production (gross weight)
1900	9,250	196		9,450	111	2,200	46,900
1901	8,420	333		8,750	122	2,400	42,900
1902	7,590	407		8,000	325	6,100	41,300
1903	12,300	223		12,500	57	1,000	54,700
1904	16,300	235		16,500	45	820	65,200
1905	16,500	216		16,700	63	1,100	65,800
1906	20,700	447		21,100	59	1,100	87,400
1907	18,800	664		19,500	63	1,100	95,300
1908	8,910	247		9,160	110	2,000	74,800
1909	14,800	74		14,900	104	1,900	86,800
1910	15,100	88		15,200	80	1,400	67,100
1911	19,000	125		19,100	83	1,500	99,000
1912	15,100	65		15,200	75	1,300	86,000
1913	20,700	111		20,800	73	1,200	55,100
1914	34,600	109		34,700	43	700	
1915	36,300	113		36,400	47	750	
1916	49,900	91		50,000	49	730	
1917	52,000	87		52,100	70	890	
1918	44,000	66		44,100	52	560	
1919	36,800	71		36,900	38	360	
1920	60,200	6	2,740	57,500	17	140	
1921	18,900	46		53,800	85	770	
1922	33,000	0.157		50,200	82	800	
1923	54,000	0.190		46,600	74	710	
1924	47,300			42,900	67	640	
1925	47,200			39,300	65	610	
1926	47,900			35,600	65	600	
1927	41,500			32,000	84	780	
1928	52,300	2,100	26,000	28,400	25	230	
1929	68,200	2,100	30,600	39,700	44	420	
1930	71,300	4	31,700	39,600	58	570	
1931	68,400	230	33,300	35,300	45	480	
1932	69,600	0.142	34,300	35,300	10	120	
1933	72,000	0.250	33,600	38,400	24	310	
1934	92,800	0.078	39,700	53,100	36	440	
1935	105,000	0.174	53,000	52,000	41	490	
1936	120,000	0.438	47,200	72,800	42	490	
1937	137,000	0.168	71,300	65,700	38	430	
1938	82,600	0.147	35,900	46,700	45	520	
1939	74,200	0.18	34,900	39,300	63	730	
1940	73,400	0.175	24,600	48,800	65	760	
1941	86,400	0.47	16,000	70,400	70	770	
1942	70,400		14,000	56,400	74	740	
1943	79,500	0.106	10,400	69,100	73	690	
1944	83,200		12,500	70,700	71	650	
1945	94,900	0.312	16,600	78,300	71	650	
1946	118,000	23	20,400	97,600	71	590	
1947	132,000	0.438	32,800	99,200	73	530	
1948	122,000	0.71	27,200	94,800	75	500	
1949	126,000	0.206	41,900	84,100	55	380	

# BORON STATISTICS

By David A. Buckingham and Phyllis A. Lyday

[All values are in metric tons (t) unless otherwise noted]

Last modification: August 28, 2002

Year	Production	Imports	Exports	Apparent consumption	Unit value (\$/t)	Unit value (98\$/t)	World production (gross weight)
1950	173,000	0.284	54,600	118,000	63	430	
1951	219,000	0.331	81,700	137,000	49	310	
1952	153,000	0.2	39,500	113,000	65	400	
1953	194,000	0.145	53,300	141,000	62	380	
1954	209,000		78,700	130,000	106	642	
1955	223,000	5	85,200	138,000	110	670	
1956	243,000	11	93,300	150,000	110	660	
1957	244,000	2,000	82,100	164,000	110	640	
1958	241,000	11	90,200	151,000	120	680	
1959	285,000		97,100	188,000	131	732	
1960	294,000		115,000	179,000	131	720	
1961	284,000		103,000	181,000	131	716	
1962	308,000		112,000	196,000	131	708	
1963	335,000		130,000	205,000	131	697	
1964	386,000	18	147,000	239,000	131	689	172,000
1965	386,000	2,500	81,500	307,000	131	679	189,000
1966	419,000	4,800	97,300	327,000	141	709	209,000
1967	429,000	10,700	87,400	352,000	144	702	221,000
1968	471,000	7,700	97,500	381,000	154	723	232,000
1969	500,000	9,800	110,000	400,000	154	684	251,000
1970	510,000	11,000	110,000	411,000	174	731	257,000
1971	515,000	3,000	95,400	423,000	173	696	284,000
1972	551,000	8,200	89,100	470,000	173	675	314,000
1973	602,000	7,400	99,300	510,000	184	675	342,000
1974	562,000	8,800	117,000	453,000	226	747	328,000
1975	547,000	11,300	115,000	443,000	242	733	354,000
1976	572,000	12,200	116,000	468,000	254	728	2,340,000
1977	667,000	28,600	141,000	554,000	272	732	2,730,000
1978	706,000	51,100	164,000	593,000	295	738	2,660,000
1979	725,000	40,300	175,000	590,000	385	864	2,520,000
1980	710,000	35,900	173,000	572,000	390	770	2,610,000
1981	671,000	16,800	152,000	536,000	429	770	2,560,000
1982	551,000	16,700	123,000	445,000	464	780	2,270,000
1983	578,000	28,500	124,000	483,000	464	760	2,240,000
1984	667,000	64,700	289,000	442,000	480	750	2,510,000
1985	577,000	63,300	314,000	327,000	494	750	2,510,000
1986	571,000	56,100	310,000	317,000	507	750	2,510,000
1987	625,000	59,500	316,000	369,000	521	748	2,690,000
1988	578,000	58,900	310,000	327,000	521	718	2,990,000
1989	562,000	52,200	353,000	261,000	569	748	2,990,000
1990	608,000	51,700	320,000	339,000	569	710	2,910,000
1991	626,000	49,000	309,000	366,000	517	619	2,960,000
1992	554,000	94,400	294,000	354,000	523	608	2,670,000
1993	574,000	296,000	287,000	582,000	636	717	2,640,000
1994	550,000	176,000	303,000	422,000	678	746	3,810,000
1995	728,000	223,000	342,000	609,000	678	725	4,020,000
1996	581,000	216,000	218,000	579,000	785	815	4,330,000
1997	604,000	281,000	293,000	592,000	711	722	4,570,000
1998	587,000	254,000	291,000	550,000	711	711	4,660,000
1999	618,000	258,000	249,000	627,000	787	770	4,380,000

# **BORON STATISTICS**

**By David A. Buckingham and Phyllis A. Lyday**

**[All values are in metric tons (t) unless otherwise noted]**

**Last modification: August 28, 2002**

<b>Year</b>	<b>Production</b>	<b>Imports</b>	<b>Exports</b>	<b>Apparent consumption</b>	<b>Unit value (\$/t)</b>	<b>Unit value (98\$/t)</b>	<b>World production (gross weight)</b>
2000	546,000	193,000	278,000	461,000	787	745	4,220,000

## Boron Worksheet Notes

### Data Sources

Sources for the boron worksheet are the mineral statistics publications of the U.S. Bureau of Mines and the U.S. Geological Survey—Minerals Yearbooks (MYB) and its predecessor, Mineral Resources of the United States (MR); Mineral Commodity Summaries (MCS) and its predecessor, Commodity Data Summaries (CDS); and Mineral Facts and Problems (MFP) publications. Years of publication and corresponding years of data coverage are listed in the References section below. Blank cells in the worksheet indicate that data are not available.

### Production

Production data are essentially shipments and include crude ore, and boron minerals and compounds sold or used by producers, including actual mine production and marketable products. Data for the years 1919–24 are reported as “shipped by producers.” All data are in terms of boron oxide ( $B_2O_3$ ) content. If the  $B_2O_3$  content was not reported it was calculated using the theoretical percentage of  $B_2O_3$  in each borate mineral or compound sold or used. Data are from the MR and the MYB.

### Imports

Data represent contained  $B_2O_3$  in the borate compounds imported into the United States. Most borate compounds are not pure and contain materials such as arsenic and clay. Their  $B_2O_3$  content is calculated using the theoretical percentage of  $B_2O_3$  in each borate compound imported. For the “other borates” category, contained  $B_2O_3$  is calculated using the average (mean)  $B_2O_3$  content of the boron compounds imported from 1939–83. Data were totaled on an annual basis. No import data were reported for the years 1924–27, 1942, 1944, and 1959–60. Data are from the MR and the MYB.

### Exports

Data are contained  $B_2O_3$  in the borate compounds exported from the United States. According to the MYB, most exported borax is either decahydrate or pentahydrate borax. Their average theoretical  $B_2O_3$  content is 42.2%. Current exports show a significant amount of anhydrous borax (69.2%  $B_2O_3$ ). If the type of exported borate compound, such as anhydrous boric acid, boric acid, or sodium borates is reported, their respective theoretical  $B_2O_3$  content was used to calculate contained  $B_2O_3$ . Boron compound export data were not reported prior to 1928, with the exception of the year 1920. Data were totaled on an annual basis. Data are from the MR and the MYB.

### Apparent Consumption

Apparent consumption data are in terms of  $B_2O_3$  content. For the years 1900–20, apparent consumption was equal to production plus imports. For the years 1921–27, apparent consumption was interpolated. Apparent consumption was estimated for the years 1928–2000 using the following formula:

$$\text{APPARENT CONSUMPTION} = \text{PRODUCTION (sold or used)} + \text{IMPORTS} - \text{EXPORTS.}$$

### Unit Value (\$/t)

Unit value is defined as the estimated value of boron apparent consumption in U.S. dollars of 1 metric ton (t) of 100%  $B_2O_3$  content. Boron production (sold or used) unit value from the MR and the MYB are used for the years 1900–54. Borax market price data from the CDS and the MCS are used for the years 1955–2000.

### Unit Value (98\$/t)

The Consumer Price Index conversion factor, with 1998 as the base year, is used to adjust unit value in current U.S. dollars to the unit value in constant 1998 U.S. dollars.

### World Production

Data are world mine production. World mine production data have been reported in various boron units, with different boron content (elemental boron content, and gross weight boron minerals and compounds). Because of this it was not possible to convert this data to contained  $B_2O_3$ . World production data are not reported for the years 1914–64. Data from the MR and MYB cover the years 1900–13 and 1976–2000 and are all gross weight data. Data for the years 1964–75 are in terms of elemental boron content and are from the 1975 and 1980 MFP.

### References

- U.S. Bureau of Mines, 1927–34, Mineral Resources of the United States, 1924–31.
- U.S. Bureau of Mines, 1933–96, Minerals Yearbook, 1932–94.
- U.S. Bureau of Mines, 1962–77, Commodity Data Summaries, 1962–77.
- U.S. Bureau of Mines, 1975, Mineral Facts and Problems, 1975 ed.: U.S. Bureau of Mines, Bulletin 667.
- U.S. Bureau of Mines, 1978–95, Mineral Commodity Summaries, 1978–95.

U.S. Bureau of Mines, 1980, Mineral Facts and Problems, 1980 ed.: U.S. Bureau of Mines Bulletin 671.  
U.S. Geological Survey, 1901–27, Mineral Resources of the United States, 1900–23.  
U.S. Geological Survey, 1997–2002, Mineral Commodity Summaries, 1997–2002.  
U.S. Geological Survey, 1997–2002, Minerals Yearbook, v. I, 1995–2000.  
U.S. Geological Survey and U.S. Bureau of Mines, 1996, Mineral Commodity Summaries, 1996.

**For more information, please contact:**

**Phyllis A. Lyday**  
**USGS Boron Commodity Specialist**  
**(703) 648-7713**  
**[plyday@usgs.gov](mailto:plyday@usgs.gov)**

**David A. Buckingham**  
**Minerals and Materials Analysis Section, USGS**  
**(303) 236-8747 x 239**  
**[buckingh@usgs.gov](mailto:buckingh@usgs.gov)**